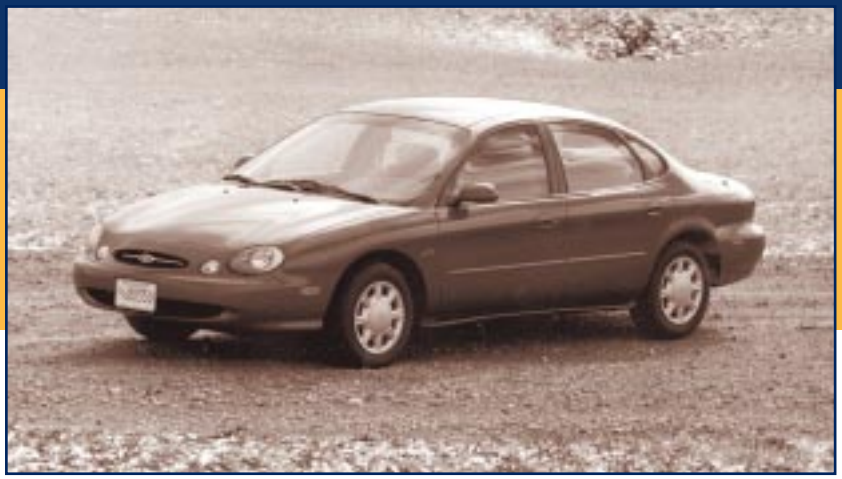
FACT SHEET

Ford Taurus

Ethanol-Fueled Sedan



The 1998 Ford Taurus is available with an optional 3.0 liter, V6 engine capable of operating on E85 (85% ethanol and 15% gasoline), unleaded gasoline, or any blend of the two. Ford has offered an E85 Taurus in its AFV lineup since 1994. These flexible-fuel vehicles (FFVs) give the driver the convenience of fueling with gasoline where E85 is not available. A sensor monitors the fuel composition and sends the information to the on-board computer, which automatically adjusts the air-fuel ratio to optimize its performance on the current mix of fuel. The estimated driving range for the FFV Taurus operating on E85 is 250–340 miles, and on gasoline it is 340–470 miles. Several design changes were necessary to allow for operation on alcohol fuels. These changes include a unique block material, exhaust valve seat inserts, wear-resistant rings, alcohol-compatible fuel injectors specially designed for high flows, increased volume evaporative canister, a stainless steel fuel system, and unique engine calibration for ethanol operation.

The U.S. Department of Energy (DOE) is promoting the use of alternative fuels and alternative fuel vehicles (AFVs). To support this activity, DOE has directed the National Renewable Energy Laboratory (NREL) to conduct projects to evaluate the performance and acceptability of light-duty AFVs. We tested a pair of 1998 Tauruses: an E85 FFV and a gasoline model as closely matched as possible. Each vehicle was run through a series of tests (the FFV Taurus was tested on both E85 and gasoline), explained briefly below. Each of these procedures has a page, on the vehicle evaluation Web site, with detailed descriptions.

Acceleration: Three tests performed (1) elapsed time from a standstill to 60 mph at wide open throttle, loaded and unloaded; (2) elapsed time from 40 to 60 mph at wide open throttle (passing simulation); (3) elapsed time and maximum speed at a quarter mile. Values are the average of six measurements.

Braking: Dry surface is concrete, wet surface is low friction Jennite pad. Minimum stopping distance from 62 mph on dry surface, and from 31 mph on wet surface with no wheels locked. Panic stops are minimum measured distance from 31 mph on wet and dry surfaces at maximum pedal pressure with no attempt to steer. Values are the average of six stops.

Fuel Economy: City fuel economy determined using an urban driving cycle—a distance of 2 miles with 8 stops. Highway fuel economy used a 70-mph average driving cycle with no stops. The 150-mile trip alternated between urban and highway cycles until 150 miles was reached. Results are reported in 70% highway driving for total trip.

Cold Start: Vehicle placed in a temperature-controlled room at -20°F for first test (minimum soak time 12 hr*). Crank time and idle rating recorded. If start successful, procedure repeated at -20°F for confirmation. If start unsuccessful, procedure repeated at higher temperature until minimum temperature is determined.

Driveability and Handling: Four different drivers rated each aspect of the vehicles; final rating is average of the four.

Emissions: Duplicate tests performed on each vehicle using EPA's Federal Test Procedure. The FFV Taurus was tested on both E85 and RF-A (industry average gasoline), and the gasoline Taurus was tested on RF-A.

*Soak time allows the vehicle to stabilize at a given temperature.

General Description

	FFV Taurus	Gasoline Taurus
Engine:		
Displacement	3.0 liter	3.0 liter
Configuration	V6	V6
Transmission	4-speed automatic	4-speed automatic
Fuel System	Sequential electronic fuel injection	Sequential electronic fuel injection
Engine Family Code	WFMXV03.0AEA	WFMXV03.0DAA
Capacities:		
Fuel	18 gal	16 gal
Passengers	2-3 front/3 rear	2-3 front/3 rear
Trunk Space (cu. ft.)	15.8	15.8
Dimensions:		
Length	197.5 in	197.5in
Width	73.0 in	73.0 in
GVWR*	4722	4722

*gross vehicle weight rating

Other Options:
Both vehicles were front wheel drive sedans equipped with air conditioning, power steering, anti-lock brakes, power door locks and windows, tilt wheel, and cruise control. The gasoline Taurus was also equipped with a power adjusted bucket drivers seat.

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Performance

Acceleration	FFV E85	FFV Gasoline	Gasoline Model
0-60 mph loaded (sec)	12.7	13.3	13.7
0-60 mph unloaded (sec)	9.9	10.4	10.5
40 to 60 mph (sec)	5.2	5.6	5.6
1/4 mile time (sec)	17.6	17.9	17.9
1/4 mile speed (mph)	80.1	78.4	78.4
Fuel Economy (mpg)			
City	12.8	18.9	17.6
Highway	20.3	26.7	28.0
Combined City/Highway	16.4	23.3	22.5

Braking	FFV E85		Gasoline Model	
Effectiveness stops:	meters	feet	meters	feet
62 mph (100 kph) dry pavement	52.3	171.6	53.0	173.8
31 mph (50 kph) wet Jennite	30.4	99.6	30.6	100.5
Panic stop				
31 mph (50 kph) dry pavement	13.7	45.1	13.4	44.0
31 mph (50 kph) wet Jennite	29.7	97.6	31.7	103.9

Cold Start	FFV E85		FFV Gasoline		Gasoline Model	
Temperature °F	crank time	idle rating	crank time	idle rating	crank time	idle rating
-20	did not start		9 sec	5	8 sec	4.5
-15	did not start					
-10	4	7				

Idle ratings from 1 to 9, 1 being lowest rating

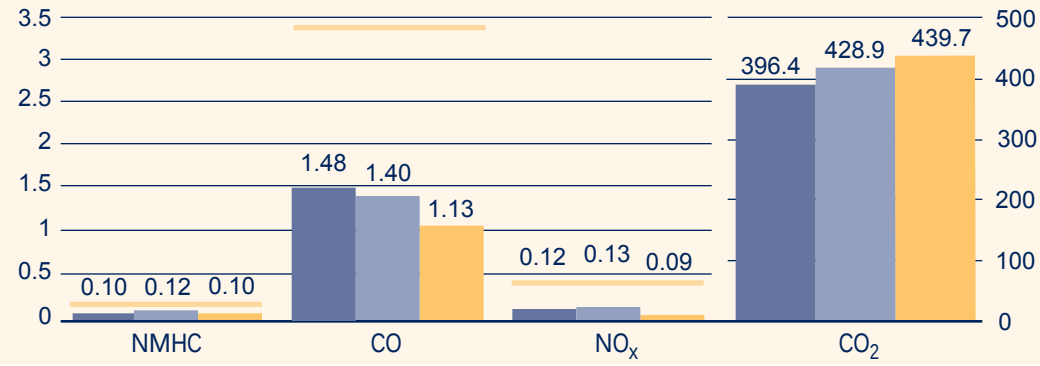
Subjective Ratings:

	FFV E85	FFV Gasoline	Gasoline Model
Routine handling	■	★	★
Emergency handling	★	★	★
Acceleration	■	■	■
Braking	■	■	■
Ride; fully loaded	■	★	■
Ride; lightly loaded	★	★	■
Noise	★	★	■
Driving position	■	■	★
Front seat comfort	■	■	★
Rear seat comfort	■	■	■
Climate control	★	★	★
Access	★	★	★
Controls & displays	■	■	★
Trunk	■	■	■

★= Excellent ■ = Good ● = Fair ❍= Poor ❒= Very Poor

Emissions

AFV-Ethanol AFV-Gasoline Gasoline Tier 1



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Clean Cities
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Evaluation Summary

Evaluation results from an FFV E85 Taurus and a gasoline Taurus showed little difference in braking or driveability and handling. Acceleration tests revealed an average of 6% improvement for the FFV tested on E85 compared to the tests on gasoline. This improvement, however, was not reflected in the driveability ratings. Fuel economy for the FFV Taurus tested on E85 was 24% to 32% lower than when the same vehicle was tested on RF-A. This was expected because E85 fuel has a lower energy content than gasoline. In other words, it takes more E85 fuel (~1.38 gallons based on the energy content of the test fuels used in this program)* to travel the same distance as 1 gallon of gasoline. Cold start tests were performed on the FFV and the standard gasoline Taurus following the manufacturers recommended practices. As with previous FFVs, we used winter grade fuel (E70—70% ethanol with 30% gasoline) for the cold start tests. Both the FFV and conventional Taurus started at -20°F when tested with gasoline. The FFV Taurus tested on E85 did not start at -20° or -15°F, but was successful at -10°F. This vehicle was equipped with an engine block heater. Although we did not use the block heater for these tests, it is expected that using this heater would have resulted in successful starts at the colder temperatures. Emissions results for both the FFV Taurus and the conventional gasoline Taurus are well below the federal Tier 1 certification standard. Emissions results for the FFV tests on E85 and gasoline revealed similar NMHC and NO_x emissions, CO_2 emissions were 9% lower for E85, and CO emissions 17% higher for E85. Emissions of total potency weighted toxics (including benzene, 1,3-butadiene, formaldehyde, and acetaldehyde)** for the FFV Taurus tested on E85 were 55% lower than that of the FFV tested on gasoline.

* See Fuel Economy Section on the web pages for a detailed explanation of energy equivalent fuel economy.

** For more information on the calculation of potency weighted toxic emissions, see the section on emissions on the Web site (http://www.ott.doe.gov/otu/field_ops/nve/).